Glendale Water & Power

Proposed Grayson Repowering Project

Stephen M. Zurn – General Manager

February 6, 2018

City of Glendale Water & Power GWP

Your Trusted Community Utility

glendale california

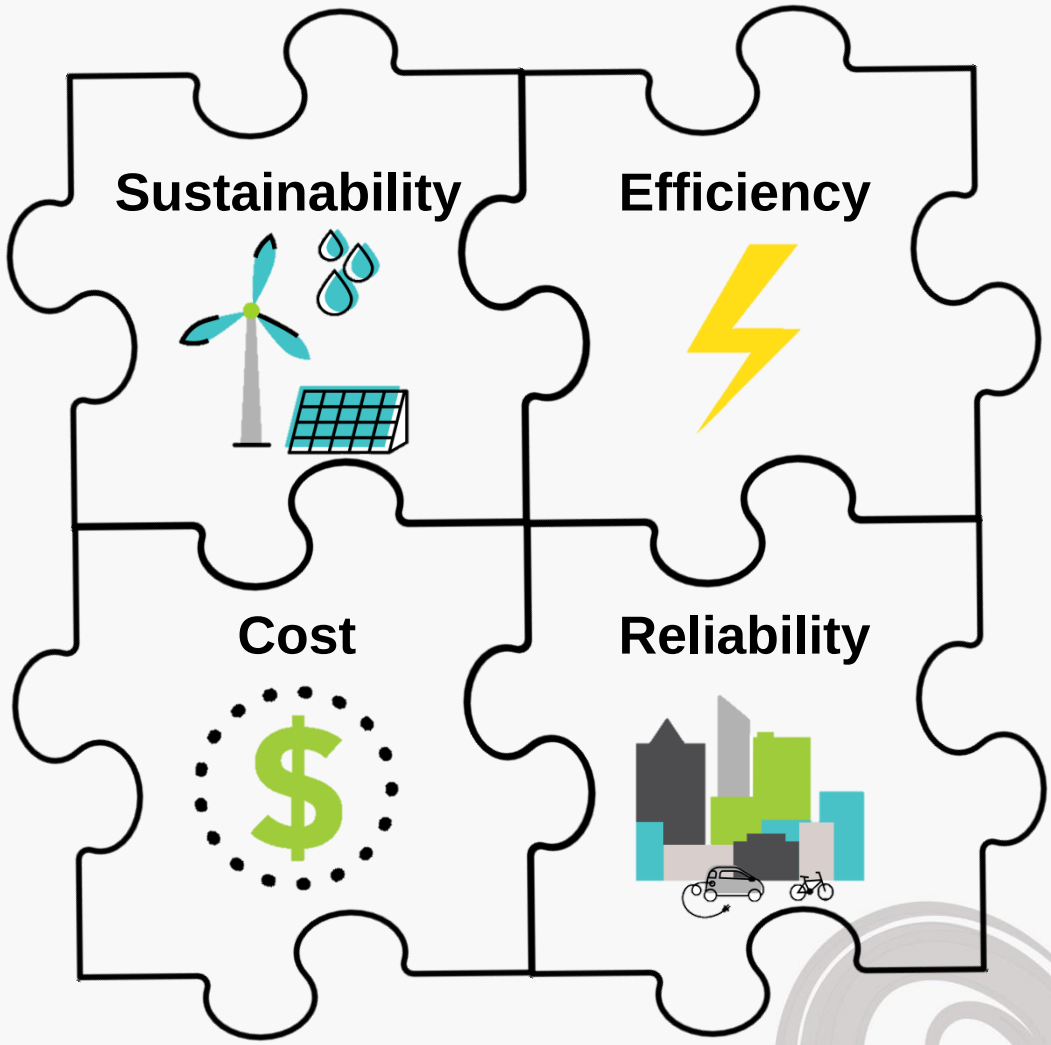
History of Grayson

- **1909:** The City purchased an existing electric distribution system
- **1937:** Glendale invested in the Hoover Dam
- **1941:** Grayson Power Plant was established

Grayson Today:

- 77 years old
- Inefficient
- High emissions
- Unreliable

GWP's Obligation to Customers



Tonight's Roadmap

- Glendale Energy Sources
- Grayson Air Quality
- Status Update on EIR Process
- Rate Impacts
- Wrap-up

What Is An Integrated Resource Plan?

- Looks at forecast of future electric load
- Develops plan to assure adequate supply for the future
- Looks at current and future trends that can affect loads and supply
- Looks at current sources of supply

Integrated Resource Plan Considerations

- IRP is a study that assesses the best ways to meet the electric loads of the utility
- Integrated Resource Plan (IRP) Updated in 2015
- Looked at a number of alternatives in planning for our future needs:

- ✓ Renewable Portfolio Standard
- ✓ Coal Replacement
- ✓ Greenhouse Gas (GHG) Compliance
- ✓ Energy Storage
- ✓ Demand Response and Energy Efficiency
- ✓ Distributed Generation - Solar Photovoltaics
- ✓ Beneficial Use of Scholl Canyon Landfill Biogas
- ✓ Transmission Capacity & Interconnections
- ✓ Retail Rates
- ✓ Grayson Power Plant

City Council Decision Points

Council Reports/Decisions	Date
Award Contract to Pace for IRP	8/19/2014
Award Contract to Stantec for OE	8/19/2014
Resolution Direction to GWP to go 250 MW	6/2/2015
RFP for Power Island Equipment	1/26/2016
Professional Service Agreement for Norton, Rose, Fulbright	2/23/2016
Professional Service Agreement for PFM	2/23/2016
Notice of Intent for GE & Siemens	7/19/2016
Resolution LNTP Siemens	11/8/2016
RFQ & RFP for EPC	2/7/2017
Project Labor Agreement for Construction	2/7/2017

City Council Directions

- June 2, 2015 - Resolution directing staff to proceed with design, engineering, environmental review, and evaluation of financing options for the 250 MW option to repower the Grayson Power Plant as identified in the Integrated Resource Planning Report.
  - City prepared a Draft Environmental Impact Report (EIR) as part of the repower effort
- City Council requested an update on the Grayson Repower
  - This is not a hearing on the Final EIR or decision to issue an approval

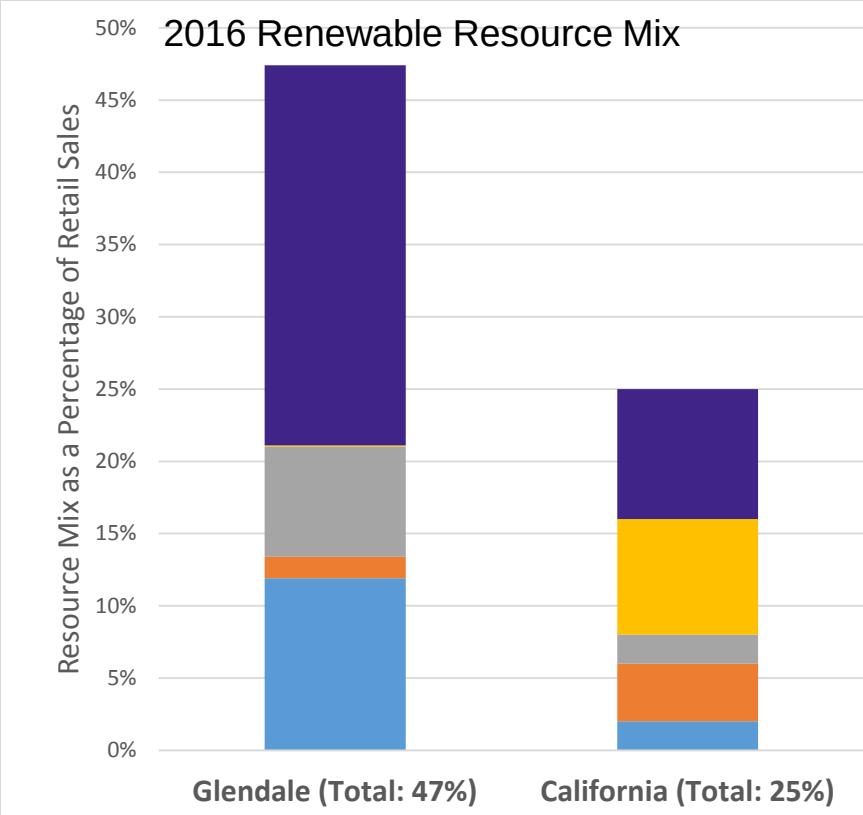
Alternatives in Draft EIR

- No Project Alternative
- Energy Storage Project Alternative
- Alternative Energy Project Alternative
  (solar, wind, with storage and transmission lines)
- 150 MW Project Alternative
  (with transmission)
- 200 MW Project Alternative
  (with storage or transmission)
- Other Alternatives Considered

Constraints

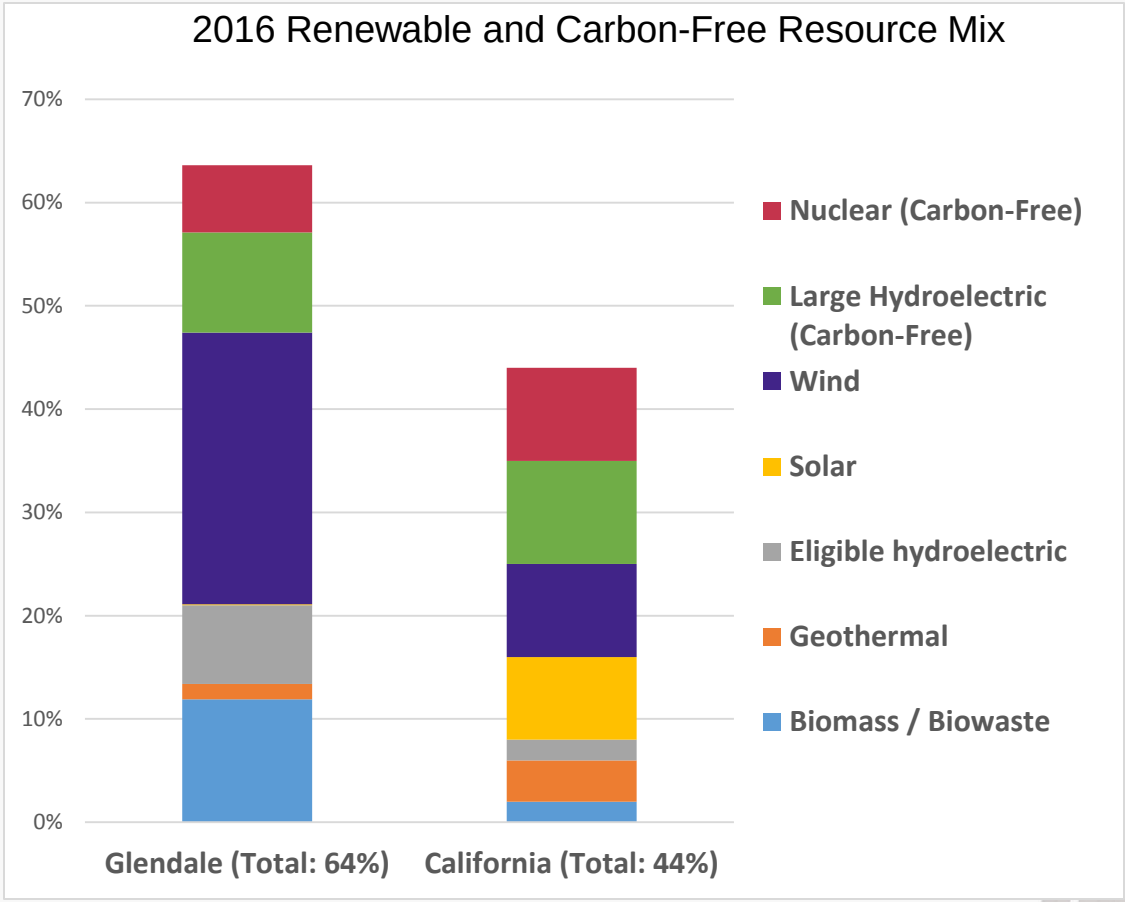
- Limited land area within Glendale for renewables
- Intermittency of renewable resources
- Time lag between solar and load peaks
- Limited electricity import capability
- Difficulty in building new electrical transmission

Progress in Renewable Energy



- California – 25% renewable energy
- Glendale – 47% renewable energy
- Glendale already meets 2020 Renewables Portfolio Standard requirement
- Glendale has nearly achieved California goal of 50% renewable energy by 2030

Progress in Sustainable Energy



- CA - total of 44% carbon-free energy in 2016
- Glendale - total of 64% carbon-free energy in 2016

Power Content Comparisons

2016 POWER CONTENT LABEL City of Glendale		
ENERGY RESOURCES	**Power Mix**	**2016 CA Power Mix****
Eligible Renewable	47%	25%
Biomass & biowaste	12%	2%
Geothermal	2%	4%
Eligible hydroelectric	8%	2%
Solar	0%	8%
Wind	26%	9%
Coal	**5%**	**4%**
Large Hydroelectric	**10%**	**10%**
Natural Gas	**29%**	**37%**
Nuclear	**7%**	**9%**
Other	**1%**	**0%**
Unspecified sources of power*	**1%**	**15%**
TOTAL	**100%**	**100%**

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the identified year.

2016 POWER CONTENT LABEL City of Pasadena			
ENERGY RESOURCES	**2016 PWP Power Mix**	**2016 PWP Green Mix**	**2016 CA Power Mix****
Eligible Renewable	32%	100%	25%
Biomass & waste	16%		2%
Geothermal	2%		4%
Small hydroelectric	1%		2%
Solar	5%	100%	8%
Wind	8%		9%
Coal	**40%**		**4%**
Large Hydroelectric	**4%**		**10%**
Natural Gas	**12%**		**37%**
Nuclear	**7%**		**9%**
Other			**0%**
Unspecified sources of power*	**5%**		**15%**
TOTAL	**100%**	**100%**	**100%**

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the identified year.

Power Content Comparisons

2016 POWER CONTENT LABEL Burbank Water and Power		
ENERGY RESOURCES	**Power Mix**	**2016 CA Power Mix****
Eligible Renewable	32%	25%
Biomass & biowaste	5%	2%
Geothermal	4%	4%
Eligible hydroelectric	3%	2%
Solar	9%	8%
Wind	11%	9%
Coal	30%	4%
Large Hydroelectric	2%	10%
Natural Gas	31%	37%
Nuclear	6%	9%
Other	0%	0%
Unspecified sources of power*	0%	15%
TOTAL	100%	100%

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

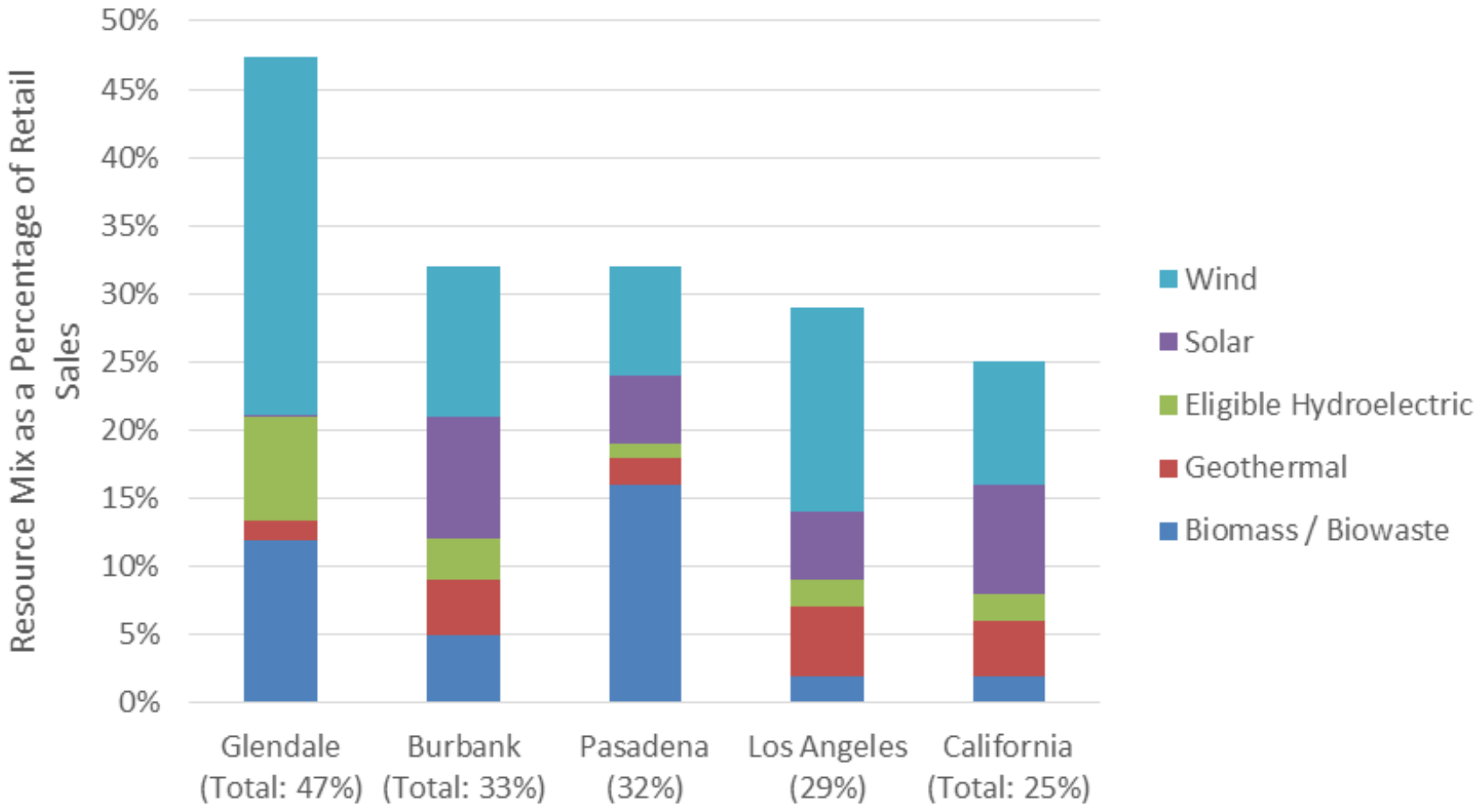
** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the identified year.

2016 POWER CONTENT LABEL Los Angeles Department of Water and Power			
ENERGY RESOURCES	**2016 Power Mix**	**2016 Green Power for Green LA Power Mix**	**2016 CA Power Mix****
Eligible Renewable	29%	100%	25%
Biomass & waste	2%	100%	2%
Geothermal	5%		4%
Small hydroelectric	2%		2%
Solar	5%		8%
Wind	15%		9%
Coal	19%		4%
Large Hydroelectric	3%		10%
Natural Gas	34%		37%
Nuclear	9%		9%
Other	0%		0%
Unspecified sources of power*	6%		15%
TOTAL	100%	100%	100%

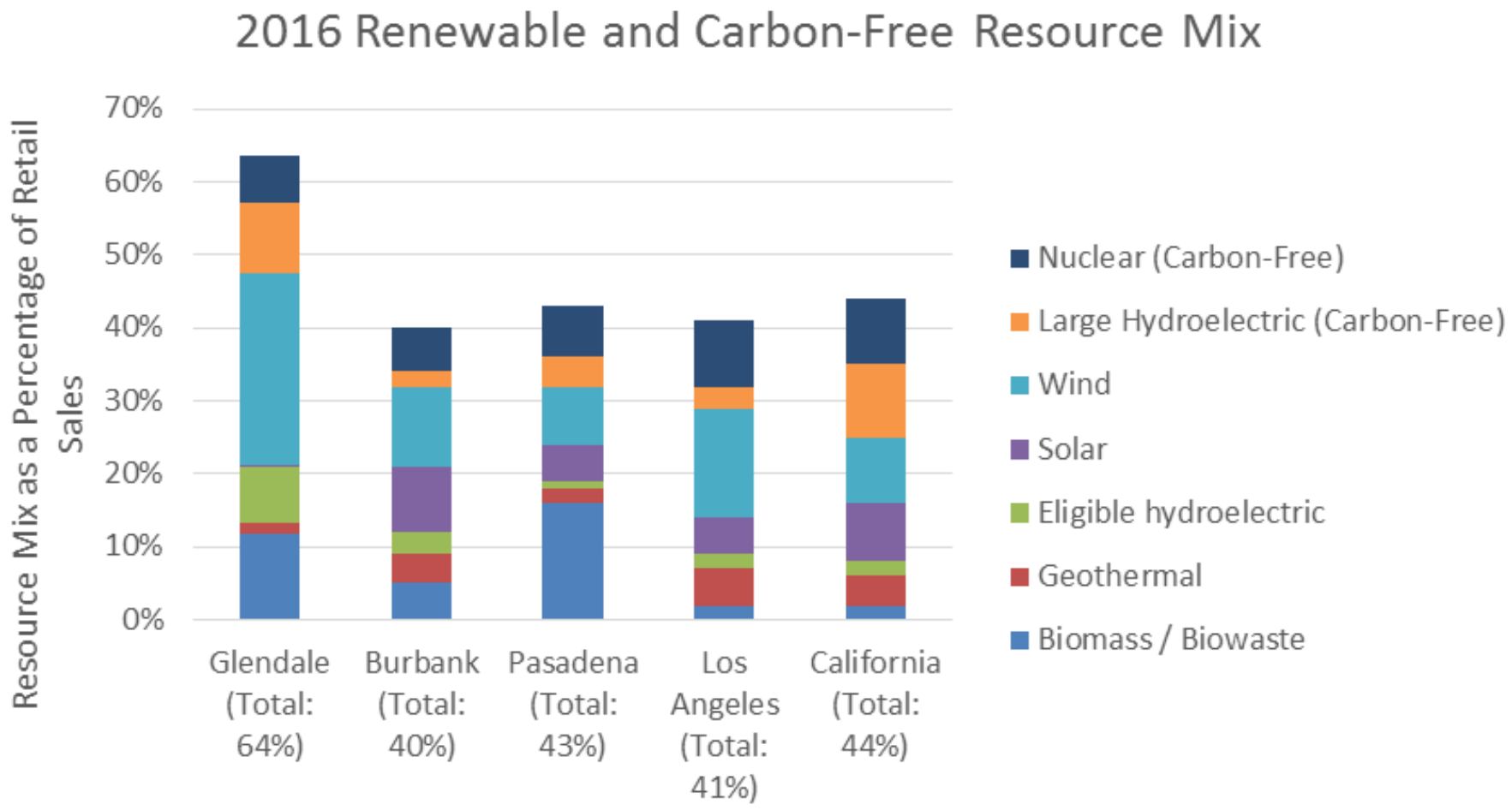
* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the identified year.

Resource Mix Per City



Renewable and Carbon Free Resource Mix Per City



GWP's Sustainable Energy Initiatives

- Demand Side Management
  - Dynamic voltage control on distribution feeders to reduce peak load
  - Voluntary customer efficiency programs
- Rooftop Solar
  - Financial incentives for customers
  - Development/participation in City projects
    - 9 MW through Solar Solutions Program
    - Glendale Community College – 202 kW-AC
    - Glendale Unified School District - 1.5 MW and 2.8 MW in the pipeline
    - Glendale Galleria – 3 MW
- Energy Storage
  - 2 MW Battery at Grandview Switching Station, 2017

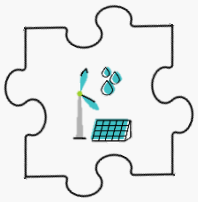
Existing Grayson

- **Not** Sustainable
  - Limited flexibility to integrate intermittent renewables
  - Emissions higher than current technology
  - Old units subject to upcoming SCAQMD regulations
- **Not** Efficient
  - Not as efficient as current technology
- **Not** Reliable
  - 40 unplanned outages since May of 2015 (equipment failures)
  - Unreliability subjecting Grayson to unplanned outages
  - Spare parts scarce or unavailable from vendors
- **Not** Cost Effective
  - Generation cost is significantly higher than current technology
  - Must purchase ancillary services and spot market energy

Purpose of Repowering Grayson

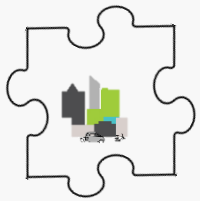
- ✓ Provide a reliable source of energy
- ✓ Provide the additional energy needed to meet 350 MW peak load
- ✓ Energy security – reduce reliance on outside sources
- ✓ Further integration of renewables by freeing up transmission capacity
- ✓ Provide a source of local power for emergencies
- ✓ Managing cost of generation

Benefits of Repowering Grayson



- ✓ Reduce emissions and potable water use, and support integration of renewables (Sustainability)

- ✓ Improve fuel economy (Efficiency)



- ✓ Respond quickly to varying loads, supply peak loads, and ensure local control over reserves (Reliability)

- ✓ Reduce maintenance costs and eliminate reliance on LADWP for reserves (Cost)

Repowering Grayson supports GWP's Mission

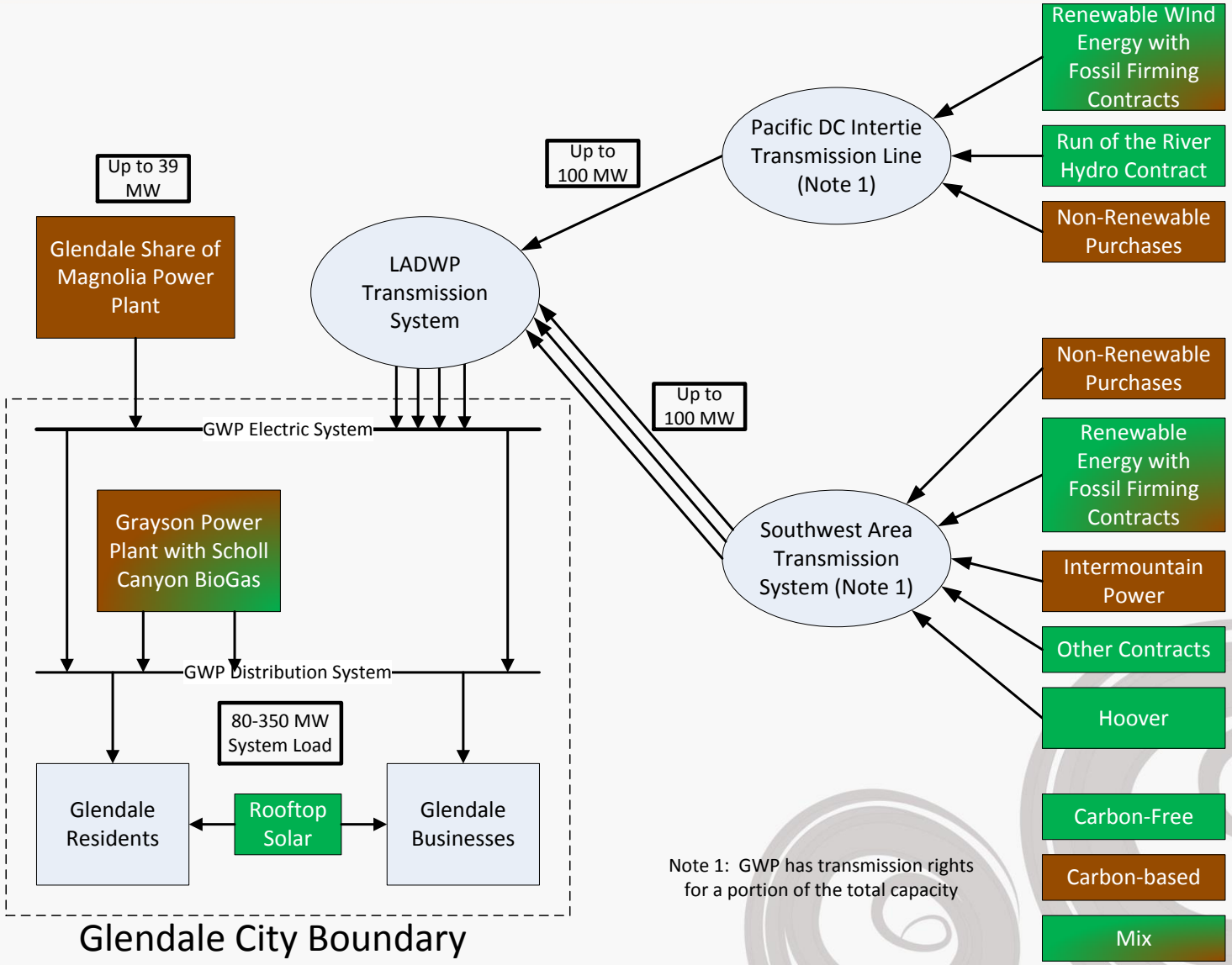
Glendale's Energy Sources

Dave Tateosian, P.E.
Principal
Clean Power Consulting Partners

City of Glendale Water & Power
GWP
Your Trusted Community Utility

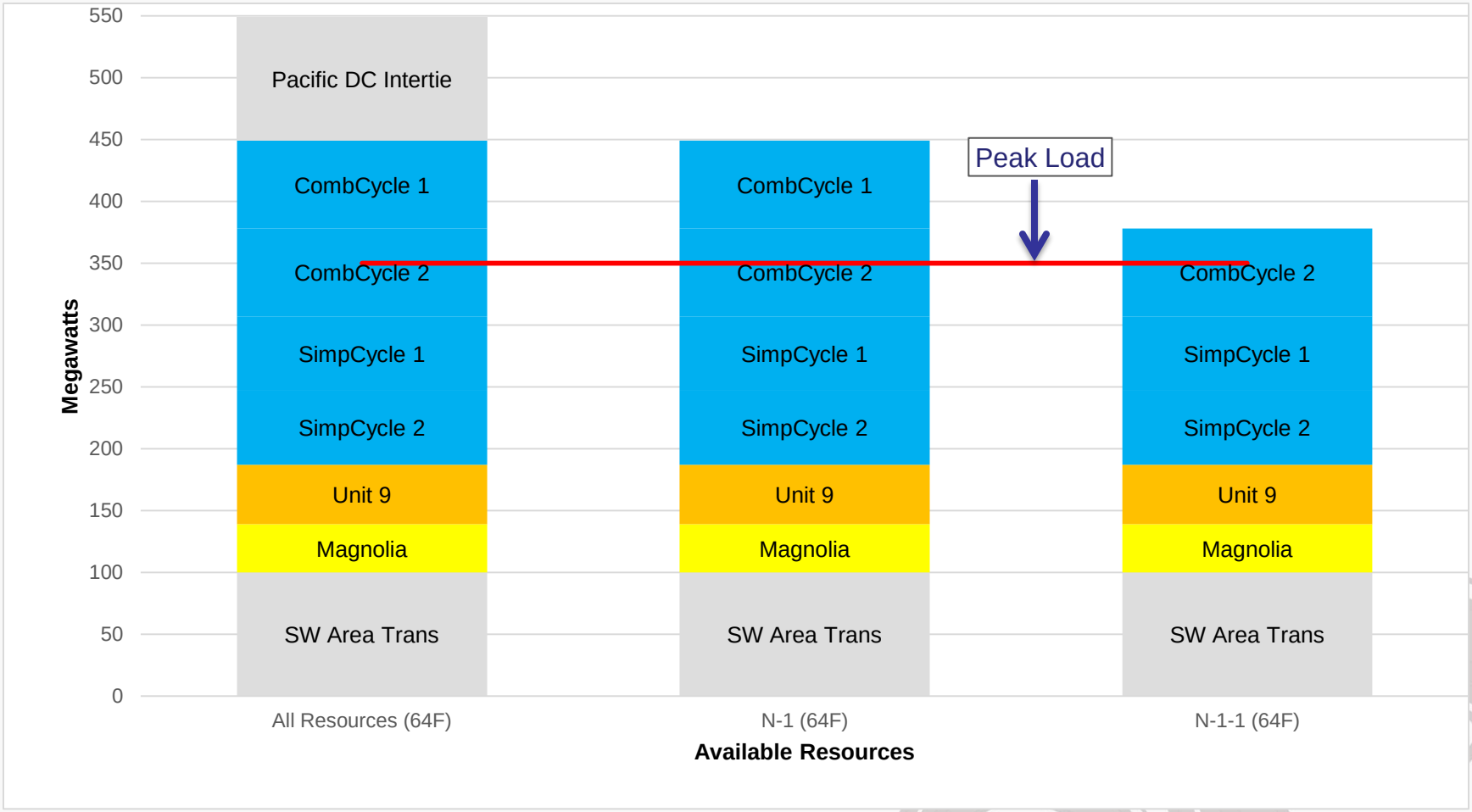
glendale california

Glendale's Energy Sources



Note 1: GWP has transmission rights for a portion of the total capacity

GWP's Electric Supply



N-1 – loss of single largest contingency per NERC requirements

N-1-1 – required to cover reserve after long-term loss of N-1 within 60 minutes

Glendale Rooftop Solar

- Current Installations
  - Private rooftop solar
  - Glendale Community College
  - Glendale Galleria
  - Glendale Unified School District
  - About 14.9 MW in all
- Available City controlled property could contribute about 3 MW
  - Public Works Building/Parking Area - 0.077 MW
  - Civic Auditorium Parking Structure – 0.040 MW
  - Civic Auditorium Overflow Lot – 0.175 MW
  - Diederich Reservoir – 2.270 MW
  - Rossmoyne Reservoir – 0.502 MW

Relying on Rooftop Solar

- IRP forecasted rooftop solar to grow to 35-40 MW by early 2030s
- Expected growth of rooftop solar does not preclude need for proposed Project
- California 2017 Rooftop Solar Costs
  - $3.79/Watt for systems >10 kW (9,302 systems)
  - $4.62/Watt for systems <10 kW (92,790 systems)
  - 100 MW ≈ $400,000,000 investment
- Also need generation or storage to address:
  - Time shift from peak solar to peak load
  - Address intermittency

Grayson Air Quality

Karl Lany, C.P.P
Director of Regulatory Compliance Services
Montrose Air Quality Services

City of Glendale Water & Power
Your Trusted Community Utility

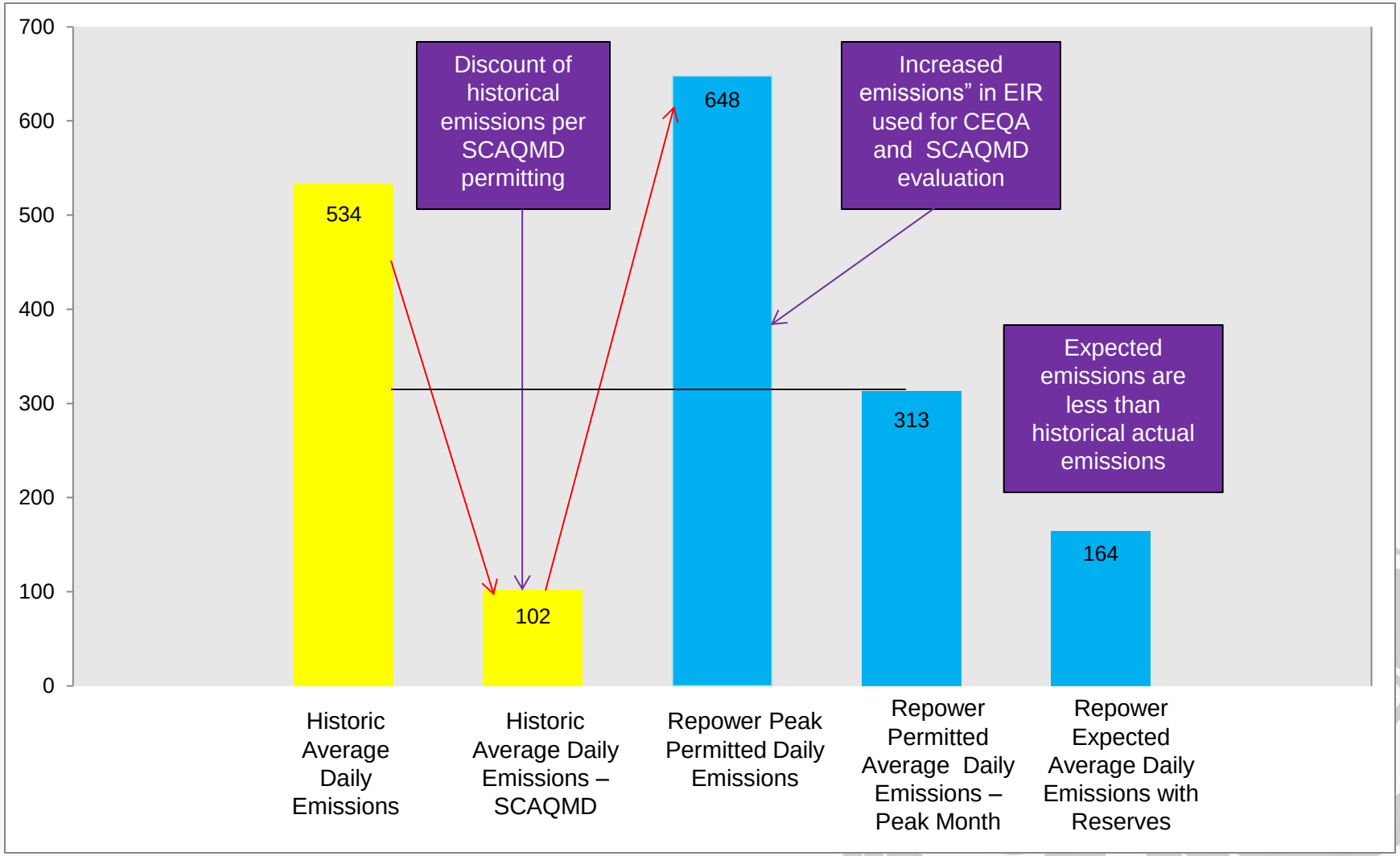
glendale california

Air Permitting Process & CEQA

- CEQA Requirements
  - Compare actual historic with worst case potential Project emissions
- SCAQMD Permitting Methodology
  - Discounts existing historic emissions increasing old/new difference
  - Amplify Project impacts by applying peak daily emissions and not sharing hours/starts between units
  - Ensures that emission offsets significantly exceed emission increases
  - Ensures that all air quality and heath risk analyses reflect worst possible case scenarios
  - Same methods applied to Draft EIR analysis

By design, emissions and air quality impacts are conservative

24 Hour NOx Emission Comparison



Why Do We Offset Emissions?

NOx, PM, VOC and SOx

- US Clean Air Act requires SCAQMD to generate emission reductions before issuing a new permit
- SCAQMD validates that emission reductions are:
  - Real
  - Permanent
  - Quantifiable
- Offsets do not substitute for meeting air quality and health risk standards
- Fees paid to SCAQMD for offsets also generate new surplus emission reductions benefiting the local community

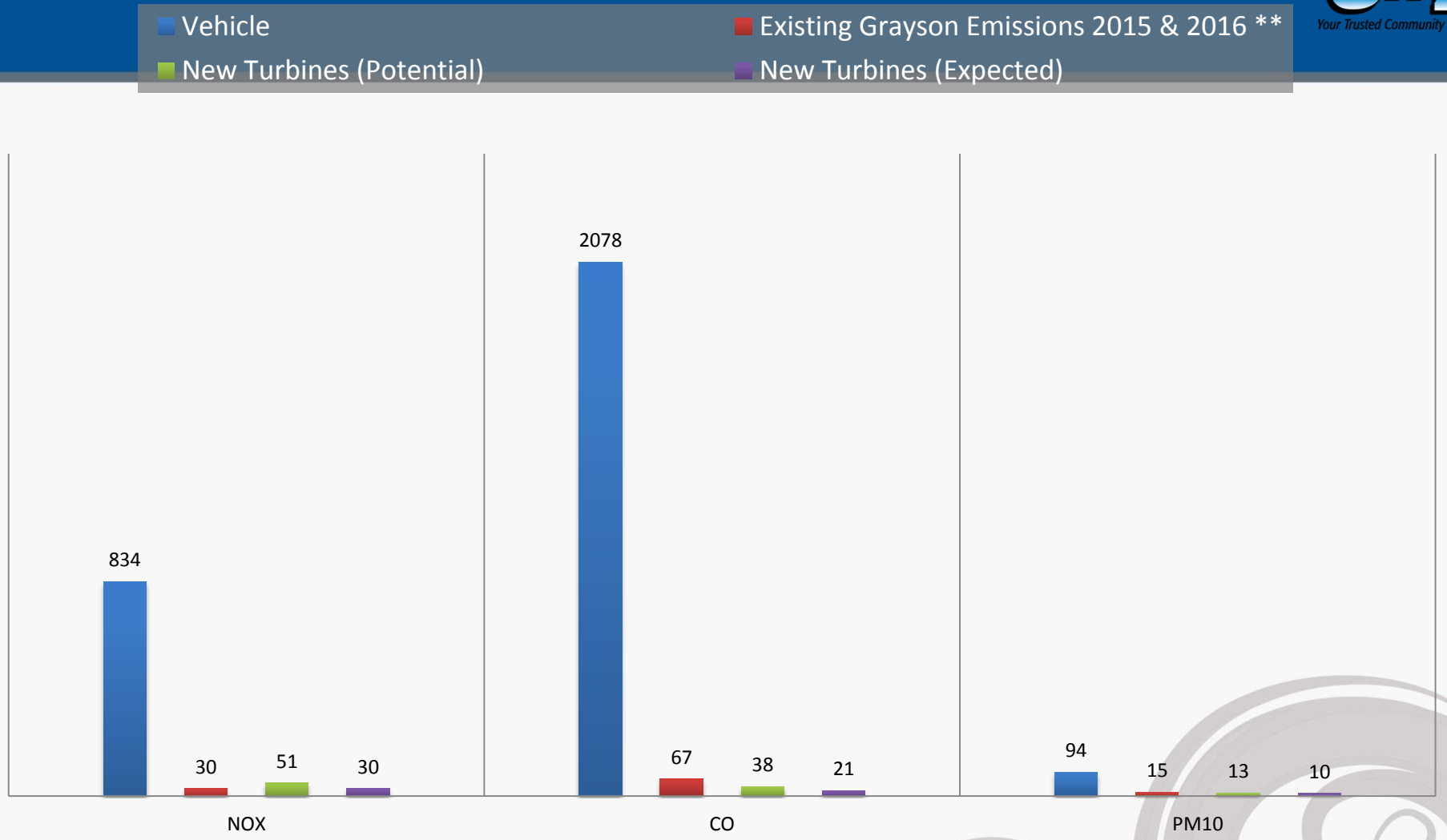
Why Do We Offset Emissions?

Greenhouse Gases (GHG)

- Cap and Trade Program established pursuant to AB32
- Impacts are global
- Through allowances, CARB ensures that overall GHG emissions will be reduced to meet AB32 requirements
- Funds paid to CARB for allowances finance a variety of environmental programs
- Other types of sources are not subject to offsetting through the program (mobile sources, commercial, household, etc.)

Local Emission Comparison Vehicle/Grayson*

Tons Per Year



1. NOx- Nitrogen Oxides – Primary constituents in smog
2. CO – Carbon Monoxide – Toxic gas created in combustion
3. PM10 – Particulate matter 10 micrometers or less in diameter (fine particles). Is of concern in respiratory related health issues
4. *Emissions from the project are also typically less than 0.1% of total basin emissions from combined mobile, stationary and area sources
5. ** Reported average annual emissions 2015 & 2016

SCAQMD

- The Draft EIR is sufficient and SCAQMD did not submit comments
- Agrees with environmental analysis
- Agrees that the Grayson Repowering Project Strategy is environmentally superior to the existing facility
- Is preparing to draft the necessary permits, will not issue until EIR is certified

Upcoming SCAQMD Regulations

- SCAQMD is proceeding with new rulemaking to reduce NOx from older boilers and gas turbines
- Would require GWP units to comply with new emission standards (equivalent to standards for new equipment)
- Rule adoption late 2018 and implementation early 2020s
- Would limit or make infeasible operation of the existing units without new major air pollution cleanup systems – may not be available or feasible

SCAQMD Risk Assessment

- Prior GWP and SCAQMD understanding of Grayson based on 1989 data
- Submitted health risk assessment to SCAQMD in 1993
- Permitted to burn landfill gas in mid-1990s
- SCAQMD collected existing Grayson emissions data in 2016
- SCAQMD will conduct a health risk assessment of existing Grayson operations

Risk Assessment

- Draft EIR study evaluated health risks of the Project, but did not evaluate existing operations
- The City recently assessed the preliminary health risk of existing units in response to public comments
  - the actual generation at Grayson Power Plant presents a cancer risk in excess of 25 in one million
  - If validated by SCAQMD, the City will be required to implement a risk reduction program
- The potential emissions from the proposed repowered Grayson plant pose a cancer risk of approximately 0.91 in one million

The Project is a viable risk reduction strategy

Status Update of EIR Process

Michael P. Weber
Principal Scientist
Stantec Consulting Services Inc

City of Glendale Water & Power
Your Trusted Community Utility

glendale california

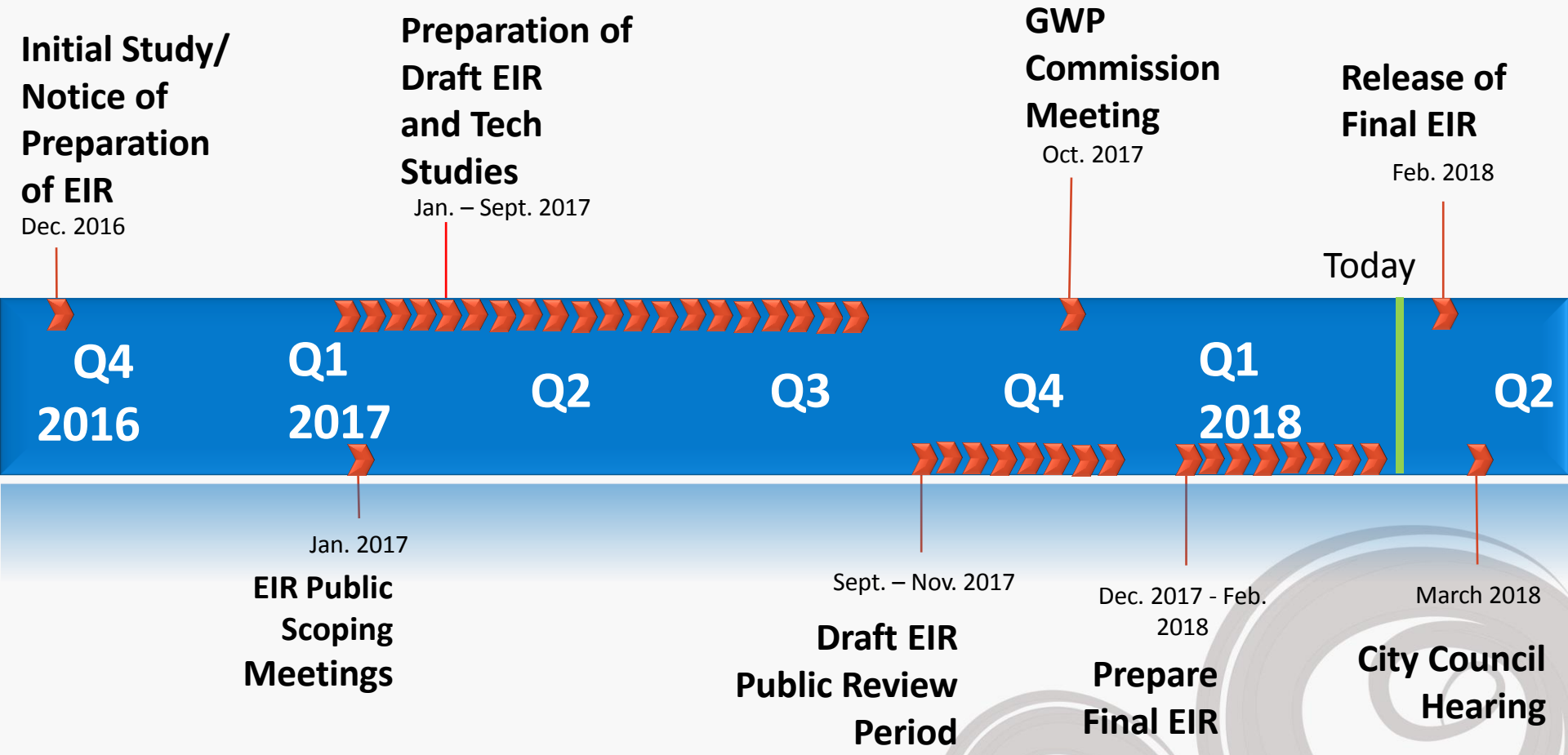
Public Comments on Draft EIR

- Approximately 1,100 public comment letters received during the 62 day public comment period (September 18 - November 20, 2017)
- An additional 130 comments were also recorded during public meetings held on October 16 and October 19, 2017

Preparation of Final EIR

- Final EIR will respond to all comments
- Final EIR anticipated for public release in February 2018
- City Council consideration of Final EIR Certification anticipated in late March 2018

Grayson Repowering Timeline



Rate Impacts

Stephen M. Zurn
General Manager
Glendale Water & Power

City of Glendale Water & Power GWP
Your Trusted Community Utility

glendale california

Cost Impacts

- The estimated cost of the Grayson Repowering Project is $500 million
- The Project would be funded through bonds to keep costs low and extend repayment over time
- Based on the improved plant efficiency and reduced costs of reserves, there is no projected cost impact to our customers
- Financial feasibility does not rely upon third-party power sales agreements

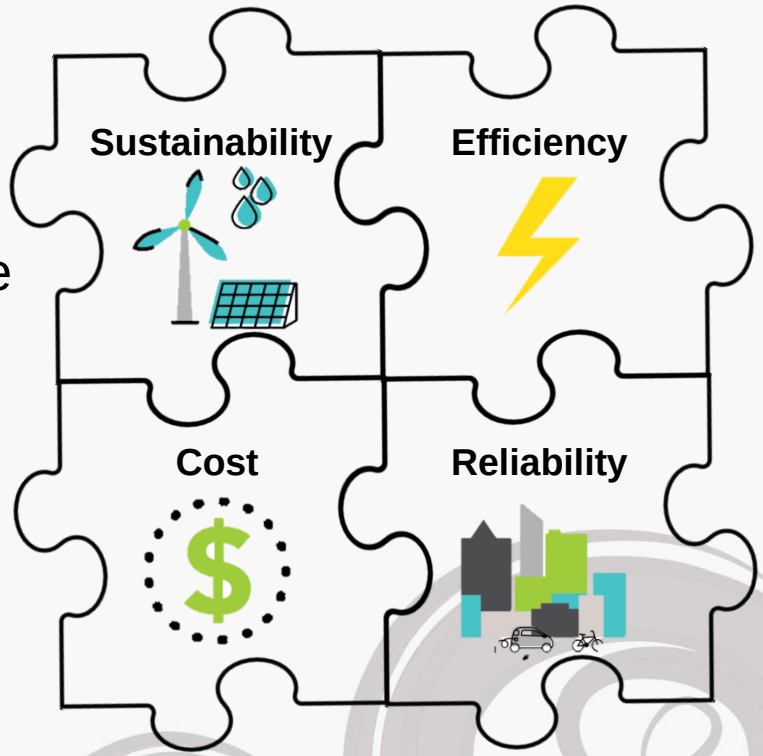
Cost Savings to Cover Debt Service

- Reduced cost to produce each kWH of energy
- Elimination of 3rd party costs for reserves
- Reduced cost of self-generation versus buying on the spot market
- Reduced cost of self-providing firming and shaping
- Reduced maintenance costs

Project's Benefits

- Sustainable
  - Supports integration of renewables
  - Significantly reduced emissions
  - Reduces health risk
  - Reduces potable water use
- Efficient
  - Reduced fuel consumption for the same energy
  - Reduced maintenance costs
- Reliable
  - New units with current technology
  - GWP can plan and be proactive
- Cost Effective
  - Reduced operating costs
  - Reduced 3rd party purchases of reserves and spot market purchases

Supports GWP's Mission



Conclusions

- The City's electric customers and local, state, and federal regulations drive utility operations and decision-making
- Grayson today is expensive, inefficient, unreliable, and is a relatively high polluter
- Glendale needs a local, dispatchable resource that allows maximum use of transmission to import renewable resources and integrates local solar
- Several options were considered, most were not viable because they did not meet load and reliability requirements
- For the proposed solutions, emissions are lower, health risks are lower, and there is no rate impact

Wrap-up & Next Steps

- Significant work has been done
  - Evaluate alternatives
  - Assess environmental impacts
  - Address public comments
  - Project development
- Final EIR will be complete and made public in approximately late February
- Back next month for a formal review of the Final EIR